

Occurrence of Anthracnose on Fruits of Asian Pear Tree Caused by *Colletotrichum acutatum*

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Anthracnose symptoms often occurred on fruits of Asian pear trees grown in Anseong, Naju, Seonghwan and Pyeongtaek in Korea during the harvesting period from 2000 to 2005. A total of 28 isolates of *Colletotrichum* sp. were obtained from the anthracnose symptoms. All the isolates were identified as *Colletotrichum acutatum* based on their morphological and cultural characteristics. Four isolates of the fungus were tested for pathogenicity to fruits of Asian pear tree by artificial inoculation. All the isolates induced anthracnose symptoms on the fruits by wound inoculation but not by unwound inoculation. The anthracnose symptoms induced by artificial inoculation were similar to those observed in the orchard. This is the first report of anthracnose of Asian pear tree caused by *Colletotrichum acutatum*.

KEYWORDS: Anthracnose, Asian pear tree, *Colletotrichum acutatum*, fruit, Pathogenicity

Asian pear tree [*Pyrus pyrifolia* (N. L. Burm.) Nakai] is mostly grown in Asian countries belonging to the temperate zone. In Korea, the plant is widely cultivated as one of important fruit trees. Anthracnose symptoms were frequently observed on fruits of Asian pear trees grown in Naju, Seonghwan and Pyeongtaek in Korea during disease survey at the harvesting time of the fruits in October from 2000 to 2005. The symptoms appeared as sunken, circular brown spots on fruits of the trees at the early stage (Fig. 1A). Lesions turned dark brown discoloration and enlarged at the later stage of the disease development (Fig. 1B). Severely diseased fruits wholly rotted. Incidence of the disease reached up to 2% infected fruits in the locations investigated.

A total of 28 isolates of *Colletotrichum* sp. were obtained from anthracnose symptoms of the Asian pear fruits. Morphological and cultural characteristics of the isolates were examined for identification. All the isolates were identified as *Colletotrichum acutatum* Simmonds ex Simmonds based on their morphological and cultural characteristics. The morphological characteristics of *C. acutatum* examined by the authors were similar to those described by Sutton (1992) (Table 1). Colonies on potato dextrose agar (PDA) were gray to dark gray, and pale yellow conidial masses were scattered on the surface of cultures (Fig. 2A). Some of the isolates produced reddish pigment in PDA culture (Fig. 2B). Conidia were hyaline, aseptate, fusiform (Fig. 2C) and measured $10.0\sim17.5 \times 3.0\sim5.5 \mu\text{m}$. The conidial ends were pointed or attenuated. Appressoria were pale to dark brown, ovate to clav-

ate, slightly irregular or lobed (Fig. 2D) and measured $5.5\sim11.0 \times 4.5\sim7.0 \mu\text{m}$.

Four isolates of *C. acutatum* were tested for pathogenicity to fruits of Asian pear tree (cultivar Niitata) by artificial inoculation with conidial suspensions ($3\sim4 \times 10^6$ conidia/ml) prepared from 20-day-old PDA cultures. Inoculation was made by dropping 20 μl of conidial suspension on the pear fruits unwounded or wounded 1~2 mm deep at 5 close points using a pin. The same quantity of sterile distilled water was used for the control fruits. The inoculated fruits were placed in a humid plastic box ($30 \times 24 \times 9$ cm) at 26°C. Disease rating was made based on the degree of rot symptoms induced on the fruits seven days after inoculation. The inoculation test was performed with three replicates. All the tested isolates of *C. acutatum* induced anthracnose symptoms on the fruits by wound inoculation (Table 2). There was no difference in pathogenicity between the non-chromogenic and chromogenic isolates of the fungus tested. The symptoms were not induced on the fruits by unwound inoculation. The symptoms induced by artificial inoculation were similar to those observed in the orchard. The isolates which induced symptoms on the fruits were re-isolated from the symptoms.

Anthracnose or bitter rot of Asian pear tree caused by *Glomerella cingulata* (Stonem.) Spauld. & Schrenk of which anamorph is *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc. has been reported in several countries including Korea (Farr *et al.*, 1989; Cho and Shin, 2004; Tai, 1979; The Phytopathological Society of Japan, 2000). However, there has been no report on anthracnose of Asian pear tree caused by *C. acutatum*. The present study

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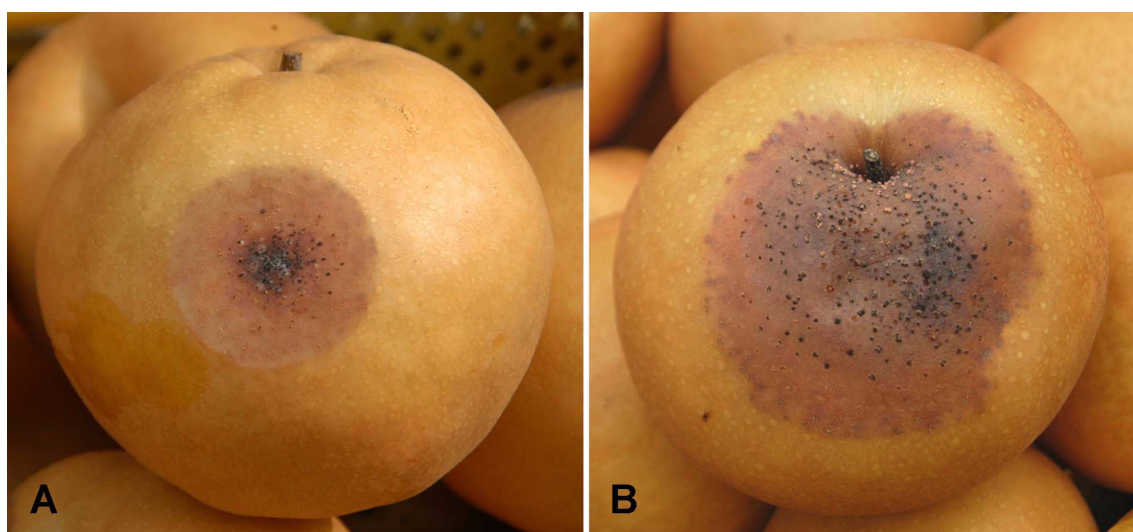


Fig. 1. Anthracnose symptoms of pear fruits observed in the orchard at the harvesting time. A, a developing lesion at the early stage; B, an enlarged lesion at the late stage.

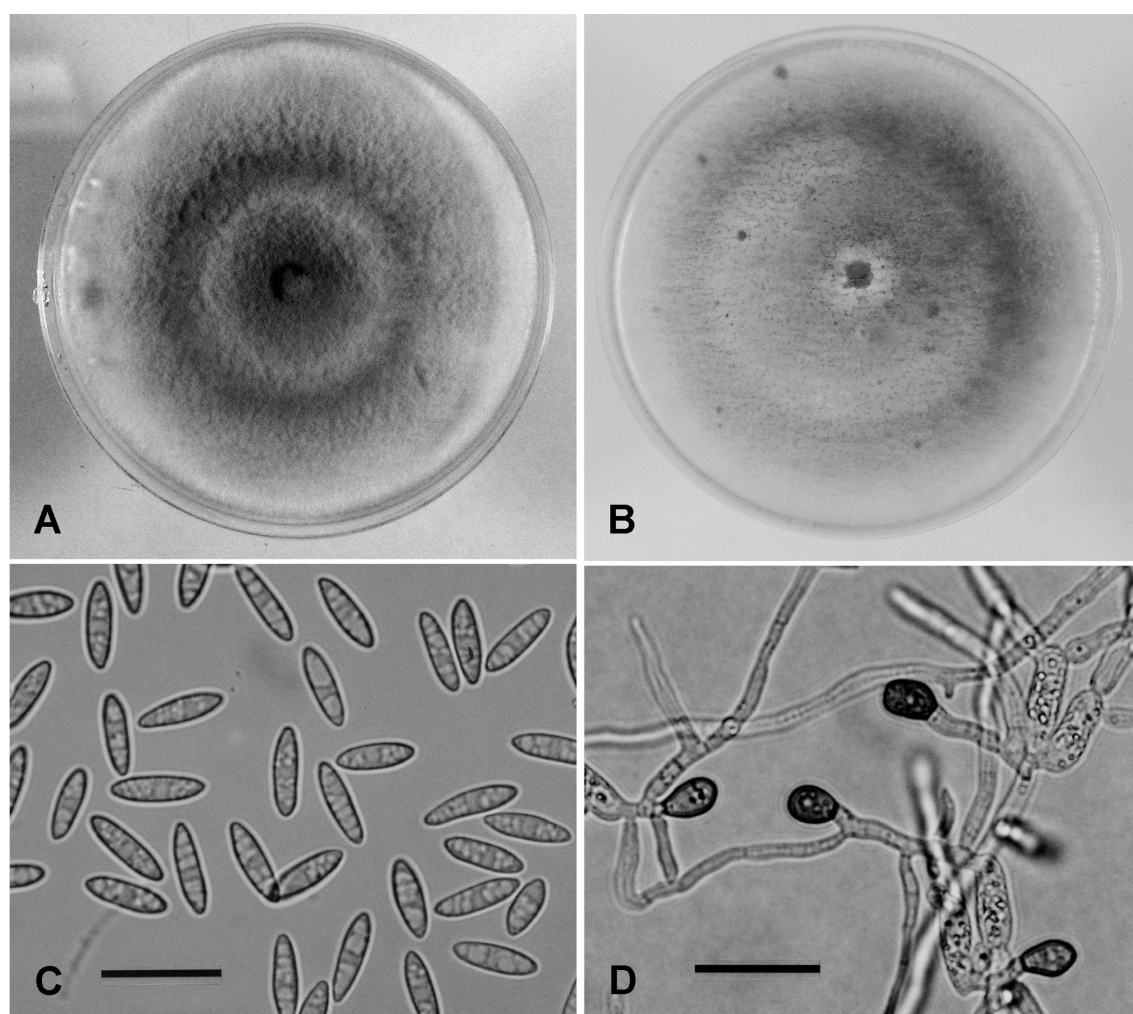


Fig. 2. Morphological and cultural features of *Colletotrichum acutatum* isolated from fruits of Asian pear tree. Non-chromogenic (A) and chromogenic (B) 20-day-old colonies grown on PDA at 24°C under alternating cycles of 12 hr NUV light and 12 hr darkness; C, conidia produced in PDA culture (scale bar = 20 μ m); D, appressoria produced in WA culture (scale bar = 20 μ m).

Table 1. Morphological characteristics of *Colletotrichum acutatum* isolated from fruits of Asian pear tree

Structure		Characteristics	
		The present isolates	Sutton (1992)
Conidium	Shape	Straight, fusiform, abruptly tapered at each end	Straight, fusiform, abruptly tapered at each end
	Size (μm)	10.0~17.5 \times 3.0~5.5	8.5~16.5 \times 2.5~4.0
Appressorium	Shape	Pale to dark brown, ovate to clavate, slightly irregular or lobed	Pale to dark brown, ovate to obovate, clavate, slightly irregular or lobed
	Size (μm)	5.5~11.0 \times 4.5~7.0	8.5~10.0 \times 4.5~6.0

Table 2. Pathogenicity of *Colletotrichum acutatum* isolates to fruits of Asian pear tree by artificial inoculation

Isolate	Location isolated	Cultural type	Lesion diameter (mm) ^a on pear fruits after inoculation	
			Wounded	Unwounded
C00-61	Naju	Non-chromogenic	20.0 \pm 10.0	—
C00-63	Naju	Non-chromogenic	22.7 \pm 9.7	—
C05-63	Seonghwan	Chromogenic	26.7 \pm 7.6	—
C05-77	Pyeongtaek	Chromogenic	19.0 \pm 1.7	—
Control			—	—

^aLesion diameter was measured seven days after inoculation. The data represents the average of three replicates \pm standard deviation. — = no symptom.

first reveals that *C. acutatum* causes anthracnose of Asian pear tree.

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